Unit-2 Mastery Assessment (version 630)

Question 1 (10 points)

Let f represent a function. If $f[4] = 27$, then there exists a knowable solution to the equation below.

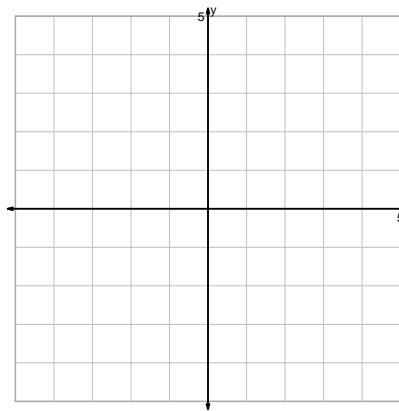$$y = 3 \cdot \left(f\left[\frac{x + 40}{16} \right] - 11 \right)$$
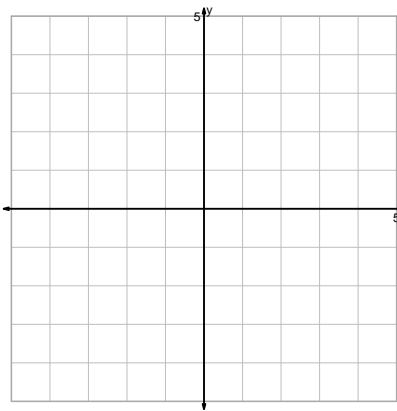
Find the solution.

$x =$

$y =$

Question 2 (20 points)

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.
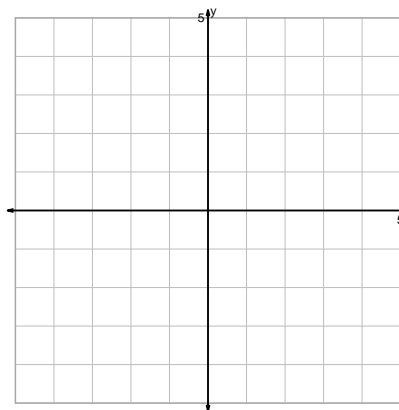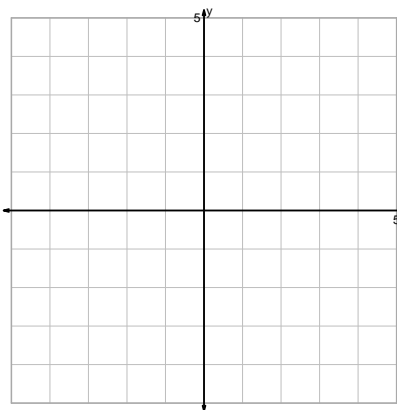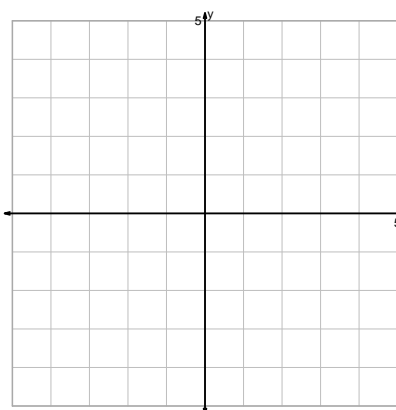
$y = 2^{-x}$

$y = 2 \cdot \sqrt[3]{x}$

$y = \left(2x \right)^2$

$y = \left(x - 2 \right)^3$

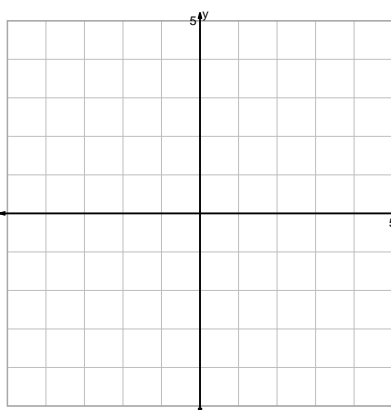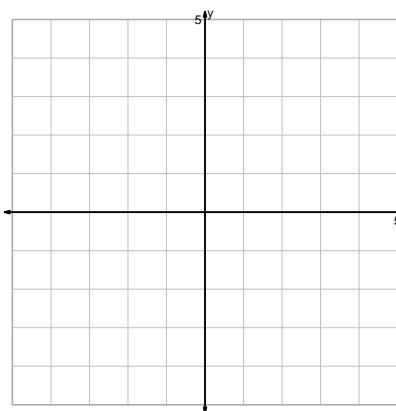**Question 2 continued...**

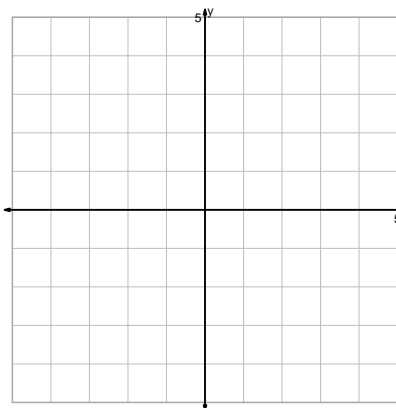$y = x^3 - 2$

$y = \sqrt{x} + 2$

$y = -\sqrt{x}$

$y = \dfrac{2^x}{2}$
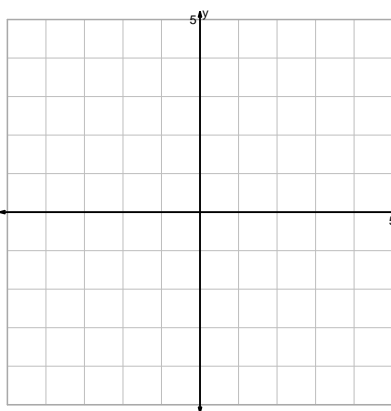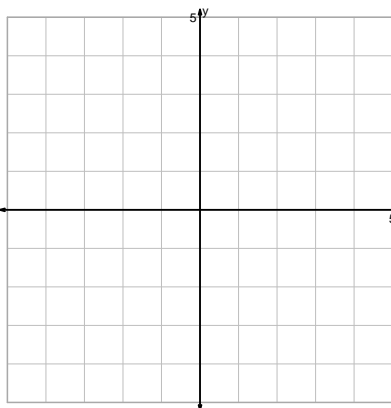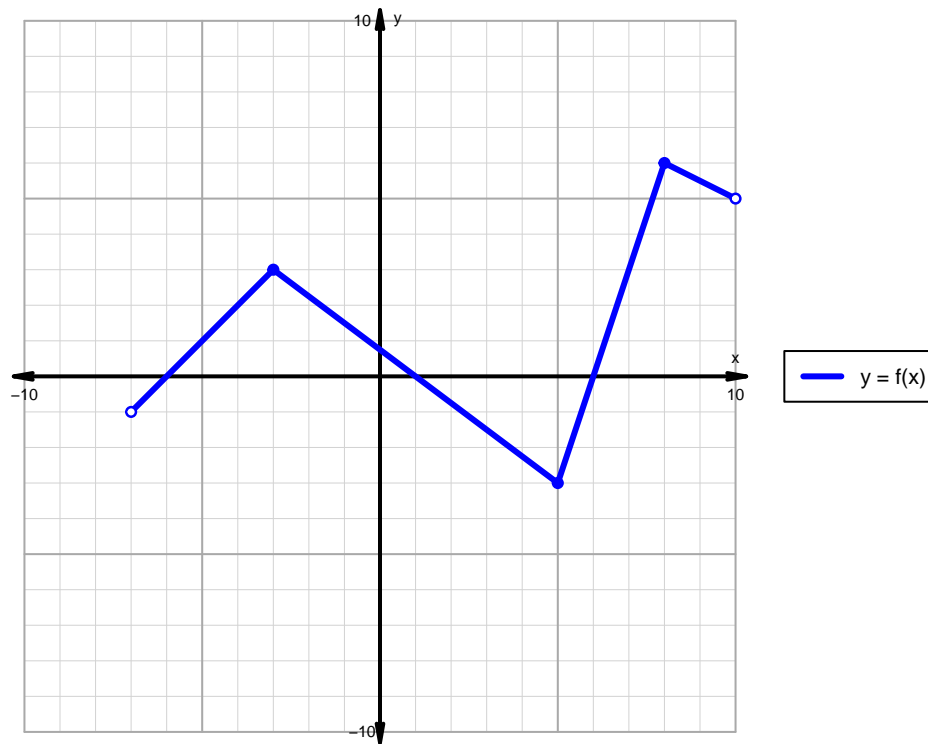
$y = \left(x + 2\right)^2$

$y = \sqrt[3]{\dfrac{x}{2}}$
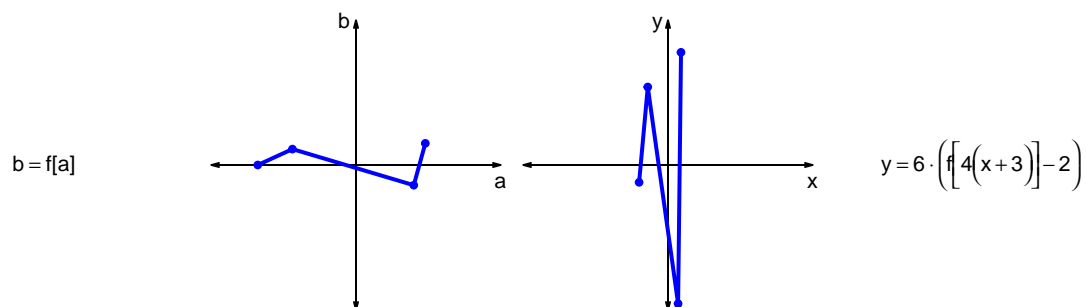
Question 3 (20 points)

A function is graphed below.

Indicate the following intervals using interval notation.

Feature	Where
Positive	
Negative	
Increasing	
Decreasing	
Domain	
Range	

Question 4 (20 points)

Let f represent a function. The curves $b = f[a]$ and $y = 6 \cdot (f[4 (x + 3)] - 2)$ are represented below in a table and on graphs.

a	b	x	y
-68	0	-20	-12
-44	11	-14	54
40	-14	7	-96
48	15	9	78

b = f[a]

$$y = 6 \cdot \left(f\left[4\left(x + 3\right)\right] - 2 \right)$$

a. Write formulas for calculating x from a and calculating y from b. (Or, write the coordinate transformation formula.)

b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = 6 \cdot (f[4 (x + 3)] - 2)$?

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Question 5 (10 points)

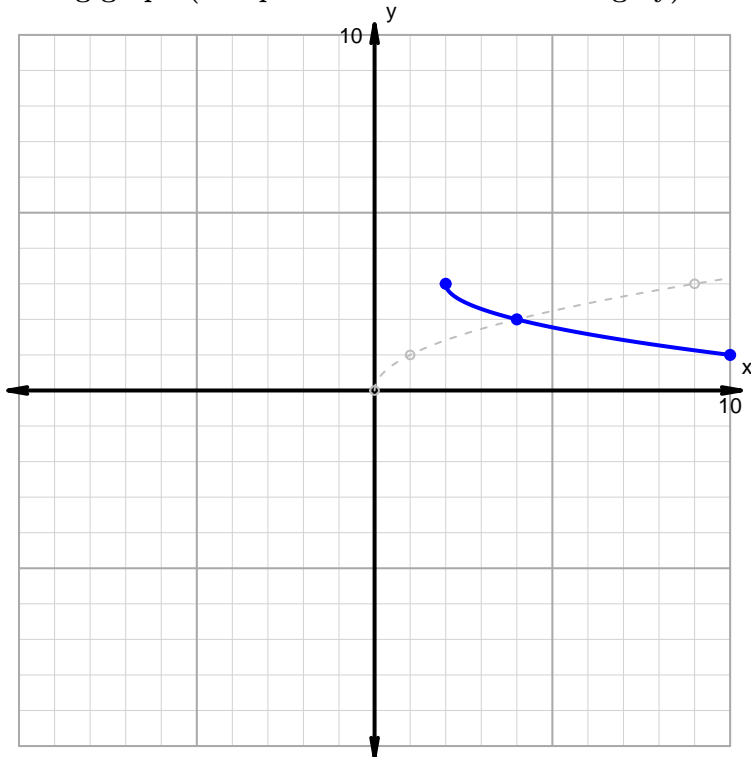A parent square-root function is transformed in the following ways:

Horizontal transformations

1. Translate right by distance 1.
2. Horizontal stretch by factor 2.

Vertical transformations

1. Translate down by distance 3.
2. Vertical reflection over x axis.

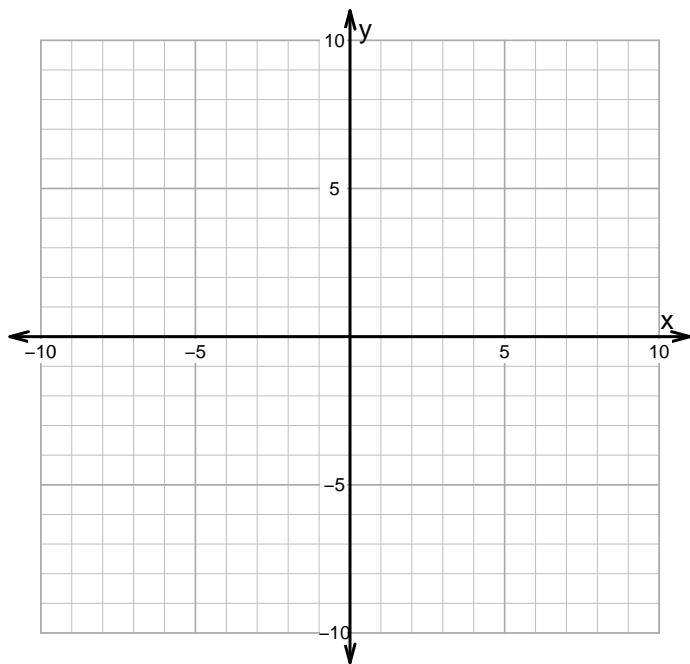### Resulting graph (and parent function in dashed grey):

- What is the equation for the curve shown above?

Question 6 (20 points)

Make an accurate graph, and describe locations of features.

$$y = \frac{-1}{3} \cdot |x - 4| + 1$$

Feature	Where
Domain	
Range	
Positive	
Negative	
Increasing	
Decreasing	